# GURU KASHI UNIVERSITY

## Doctor of Philosophy

## Session: 2025-26

## Faculty of Pharmaceutical Sciences

| | Program Structure | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sr. No.** | **Course Code** | **Course Title** | **Type of Course** | **L** | **T** | **P** | **Credits** | **Internal** | **External** | **Total Marks** |
| 1 | PPH101 | Research Methodology | Core | 4 | 0 | 0 | 4 | 30 | 70 | 100 |
| **2** | PPH102 | Research and Publication Ethics | Core | 2 | 0 | 0 | 2 | 30 | 70 | 100 |
| 3 | PPH134 | Proficiency in Pharmaceutical Research | Core | 4 | 0 | 0 | 4 | 30 | 70 | 100 |
| **4** | PPH104 | Computer Applications in Research | Skill Based | 0 | 0 | 4 | 2 | 30 | 70 | 100 |
| **Total** | | | | **10** | **0** | **4** | **12** | **120** | **280** | **400** |

**Course Title: Research Methodology**

**Course Code: PPH101**

| L | T | P | Credits |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Total Hours: 60**

**Learning Outcomes**

**On the completion of the course the students will be able to:**

1. Formulate research problems by conducting comprehensive literature reviews utilizing web sources
2. Apply appropriate research design choices based on research questions and objectives.
3. Explore the integration of qualitative and quantitative data and the concept of triangulation and complementarily of data sources.
4. Utilize statistical software packages commonly used in research for importing, managing, cleaning, and analyzing data.
5. Apply different statistical techniques to summarize and analyze data effectively.

**Course Content**

**Unit-I** **15 Hours**

**Introduction to Research**

Meaning, Objectives, Characteristics, Significance and Types of Research. Understanding a Research Problem, Literature Review, Methods and Reporting, Selecting the Research Problem, Steps in Formulation of a Research Problem,

**Unit-II** **15 Hours**

**Research Process and Hypothesis**

Constructing Hypotheses; Conceptualizing a Research Design-Meaning and Types of Research Design.

Parametric and Non-Parametric Test, Errors and Level of Significance.

Completely randomized design, Random block design, Latin square design, Statistical analysis.

Components of time series, Analysis of time series, Measurement of trend, Measurement of seasonal variations.

**Unit-III** **15 Hours**

**Sampling Design and Data Analysis**

Sampling Techniques-Probability and Non-Probability, Qualities of a good Sample, Sample Size and its Determination.

Introduction to Qualitative, Quantitative and Mixed Methods, Quantitative Methods- Univariate, Bivariate and Multivariate, Qualitative Methods-Grounded Theory and Triangulations, Mixed Methods- Convergent Parallel, Explanatory Sequential, Exploratory Sequential and Transformative.

Implementation of statistical techniques using statistical packages viz. SPSS R including evaluation of statistical parameters and data interpretation, Regression Analysis, Covariance, analysis of variance.

**Unit-IV** **15 Hours**

**Report Writing**

Types of Reports- technical and Popular Reports, Significance of Report Writing, Different Steps in Writing Report, Art of Writing Research Proposals, Research Papers, Projects Reports and Thesis; Basics of Citation and Bibliography/Reference Preparation Styles; Report Presentation: Oral and Poster Presentations of Research Reports.

**Suggested Reading**


1. Gupta, S.(2010).*Research Methodology and Statistical Techniques*. Deep & Deep Publications (P) Limited, New Delhi.
2. Kothari, C.R., Garg, G. (2019). *Research Methodology: Methods and Techniques.* 4thEdition, New Age International (p) Limited. New Delhi.
3. Sahay,Vinaya and Pradumna Singh(2009). *Encyclopedia of Research*

*Methodology in Life Sciences.* Anmol Publications. New Delhi.

4. Kauda J.(2012).*Research Methodology: A Project Guide for University Students*. Samfunds literature Publications.
5. Dharmapalan B.(2012).*Scientific Research Methodology*. Narosa Publishing

**Course Title: Research and Publication Ethics**

**Course Code: PPH102**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Total Hours 30**

## Learning Outcomes

**On the completion of the course the students will be able to**

1. To have awareness about the publication ethics and publication misconducts.
2. To understand indexing and citation databases, open access publications, research metrics (citations, h-index, impact factor etc.
3. Develop hands-on skills to identify research misconduct and predatory publications.

### Course Content

- **RPE 01: PHILOSOPHY AND ETHICS (3Hrs.)**
  1. Introduction to philosophy: definition, nature and scope, concept, branches
  2. Ethics: definition, moral philosophy, nature of moral judgments and reactions
- **RPE 02: SCIENTIFIC CONDUCT (5Hrs.)**
  1. Ethics with respect to science and research
  2. Intellectual honesty and research integrity
  3. Scientific misconducts, Falsification, Fabrication, and Plagiarism(FFP)
  4. Redundant publications: duplicate and overlapping publications, salami slicing
  5. Selective reporting and misrepresentation of data
- **RPE03:PUBLICATIONETHICS (7Hrs.)**
  1. Publication ethics: definition, introduction and importance
  2. Bestpractices/standardssettinginitiativesandguidelines:COPE,WAME, etc.
  3. Conflicts of interest
  4. Publication misconduct: definition, concept, problems that lead to

unethical behavior and vice versa, types

5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct,complaints and appeals
7. Predatory publishers and journals

**PRACTICE**

- **RPE 04:OPEN ACCESS PUBLISHING (4Hrs.)**

1. Open access publications and initiatives
2. SHERPA/ROMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder/journal suggestion tools viz.JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

**PPE 05:PUBLICATION MISCONDUCT (4Hrs.)**

**A. Group Discussions (2hrs.)**

1. Subject specific ethical issues, FFP,authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

**B. Softwaretools(2 hrs.)**

Use of plagiarism software like Turnitin, Urkund and other open source software tools

- **RPE06:DATA BASES AND RESEARCH METRICS (7Hrs.)**

**A. Databases (4hrs.)**

1. Indexing databases
2. Citation databases:Web of Science, Scopus etc.

**B. Research Metrics(3hrs.)**

1. Impact Factor of journal as per Journal Citation Report, SNIP,SJR,IPP, Cite Score
2. Metrics:h-index,g-index,i10index,altmetrics

**Suggested Readings**


1. Bird,A.(2006).Philosophy of Science. Routledge.
2. MacIntyre,A.(1967)A Short History of Ethics. London.
3. P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press.

5. Rensik, D. B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10. Retrieved from https://www.niehs.nih.gov/resources/biothics/whatis/index.cfm
6. Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179-179. https://doi.org/10.1038/489179a

**Course Title: Proficiency in Pharmaceutical Research**

**Course Code: PPH134**

| L | T | P | Credits |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Total Hours 40**

## Learning Outcomes

**On the completion of the course the students will be able to**

1. The students will become familiar with the usage of different pharmaceutical regulatory requirements.
2. The student will get acquainted with API isolation and designing process.
3. The student will familiriaze with various product process development and evaluation process with technology transfer.

## Course Content

**UNIT-I** **10 Hours**

**Central Drug Standard Control Organization (CDSCO)**:

Functions and responsibilities Investigational New Drug : Need of an IND, Content and Format of an IND application, Submission of an IND, FDA review of IND. The New Drug Application : Overview, Law regulations and Guidance, new drug development and approval, NDA development preclinical investigation, new drug application (phase I, phase II, phase IV and post marketing surveillance), Common technical document (CTD) for NDA, Submission, review and maintenance of NDA.

**UNIT-II** **10 Hours**

**Oral Controlled drug delivery systems** :

Design and fabrication of diffusion controlled, dissolution controlled, osmotic, gastro-retentive delivery systems, biodegradable polymeric delivery systems. Controlled drug delivery polymers, roles of polymers in drug delivery, pharmacokinetic/ pharmacodynamic basis of oral controlled drug delivery.

**UNIT-III** **10 Hours**

**Drug Design:**

Approaches to drug design, method of variation, biochemical and physiological approaches. Lead compound - Search & Optimization: Search of lead compound from natural products and other sources, selection of test compounds. Methods of lead optimization. Common animal models for selected categories of drugs: anti-hypertensive, anti-inflammatory, anti-diabetic, anti-ulcer, anti-oxidants.

**UNIT-IV** **10 Hours**

**Extraction:**

Different techniques adopted for the extraction of phyto-constituents like Maceration, percolation, sonication, soxhlet assisted extraction, ultrasound assisted extraction, super critical carbon dioxide extraction and Microwave assisted extraction.

**Suggested Readings:**

1) Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and IsaderKaufer, Marcel Dekker series, Vol.143

2) The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P.Martin, Drugs and the Pharmaceutical Sciences,Vol.185, Informa Health care Publishers.

3) Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.

4)Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.

5) Pharmacognosy- G. E. Trease and W.C. Evans. Saunders Edinburgh, New York.

6) Glimpses of Indian Ethano Pharmacology, P. Pushpangadam. Ulf Nyman. V.George Tropical Botanic Garden & Research Institute, 1995.

7)Biological standardization by J.H. Burn D.J. Finney and I.G. Goodwin

8)Evaluation of drugs activities by Laurence and Bachrach

9) Process Chemistry in the Pharmaceutical Industry: Challenges in an Ever Changing Climate-An Overview; K. Gadamasetti, CRC Press.

10) Pharmaceutical Manufacturing Encyclopedia, 3rd edition, Volume 2.

11) Medicinal Chemistry by Burger, 6th edition, Volume 1-8

**Course: Computer Applications in Research**

**Course Code: PPH104**

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 4 | 4 |

**Learning Outcomes**

**On the completion of the course the students will be able to**

1. The students will become familiar with the usage of software for managing the reference.
2. To make literature reviews easily.
3. To make reference management by using open software.

**Course Content**

**Unit-I** **06 Hours**

**MS Word Essentials-**Create a document with styled headings and subheadings, Add headers, footers, and page numbers, Adjust page layout settings (margins, orientation, page size).

**Table Creation and Management-**Insert, format, and style tables, Adjust cell size, merge/split cells, and sort/filter data.

**Working with Graphics-**Insert and format images, shapes, SmartArt, and text boxes, Apply text wrapping around objects.

**Unit-II** **08 Hours**

**Basics of PowerPoint**- Slide layouts, themes, and templates, Adding multimedia: Images, audio, and videos.

**Advanced Techniques**- Animations and transitions for visual effects, Slide master for consistent formatting, Interactive elements: Hyperlinks and action buttons.

**Design Best Practices**- Typography, color schemes, and visual hierarchy, Tips for engaging presentations.

**Unit-III** **08 Hours**

**Introduction to Mendeley**- Installing and setting up Mendeley Desktop and Web, Importing references from various sources.

**Organizing References**- Creating folders and tagging references, Annotating and highlighting PDFs.

**Citations and Bibliography**- Integrating Mendeley with MS Word, using citation styles (APA, MLA, Chicago), Generating a bibliography automatically.

**Unit-IV** **08 Hours**

**AI Tools for Productivity-** Text-Based AI Tools (e.g., ChatGPT) Writing assistance, summarization, and brainstorming, Grammar and style checking, Image and Design Tools, Speech and Audio Tools

**Suggested Readings**


1) Office 2007 in Simple Steps, Kogent Solutions, (Wiley Publishers).
2) MS-Office 2007 Training Guide, S. Jain (BPB Publications).
3) Computer Fundamentals by P.K. Sinha (BPB Publications).
4) https://www.mendeley.com/reference-management/reference-manager
5) https://chat.openai.com
6) https://edu.google.com/workspace-for-education/classroom/